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Eastern South Dakota Soil and Water Research Farm

Annual Report to the Board of Directors

South Dakota State University
USDA, ARS, Morris MN
USDA, ARS, Brookings SD

Annual Report

Eastern South Dakota Soil and Water Research Farm

Volume 2, March 1991

W. E. Riedell, Editor
S. J. Hubbard, Technical Editor

Farming cannot take place except in nature; therefore, if nature does not thrive, farming cannot thrive. But we know too that nature includes us. It is not a place into which we reach from some safe standpoint outside it. We are in it and we are part of it while we use it. If it does not thrive, we cannot thrive. The appropriate measure of farming then is the world's health and our health, and this is inescapably <u>one</u> measure.

-Wendell Berry, 1989

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Table of Contents

Planning Committee Actions 1

P. E. Stagenga 2

M. Pravecek 3

R. W. Kieckhefer 11

S. A. Clay 12

K. D. Kephart 16

J. Maursetter 19

W. E. Riedell 24

Planning Committee Actions

Eastern South Dakota Soil and Water Research Farm

The planning committee met on 14 March 1991 at the USDA, ARS, Northern Grain Insects Research Laboratory. People who attended and their proposed 1991 contributions were:

South Dakota State University

Dr. Sharon Clay, weed research
Dr. Thomas Schumacher, landscape position and fertilizer placement
Dr. Diane Rickerl, soil fertility
Dr. Kevin Kephart, grass ecology
Dr. Tom Dobbs, agricultural economics

USDA, ARS, Morris MN

Dr. Mike Lindstrom, landscape position research
Mr. Pete Stagenga, farm manager

USDA, ARS, Brookings SD

Dr. David Woodson, entomology research
Mr. Max Pravecek, agricultural technician
Dr. Walter Riedell, fertilizer placement research
Dr. Robert Kieckhefer, insect pest and predator research
Dr. Jan Jackson, research leader
Mr. Dave Beck, agricultural technician

It was brought to the attention of the committee that a fertilizer spreader and a weigh wagon have been purchased, and that there is still a need for a stalk chopper. Seed and chemicals for the 1991 season have been ordered.

There was a general consensus among committee members that farm operations in 1990 went extremely well due to the hard work contributed by Pete and Max.

An open invitation was given to all scientists at the cooperating institutions to participate in research on the farm.

Data accumulation will be supported by DBASE software with separate entries for plot number, input level, year, rotation, crop, fall and spring tillage, herbicide type and rate, insecticide type and rate, fertilizer type and rate, and yield. In addition, a weather station will be set up to record soil temperature, air temperature, dew point, precipitation, and humidity.

There was a general consensus among the scientists that data collection on the plots has been and will continue to be hampered by lack of funding. Data collection will continue in 1991, but at a much smaller level than desired.

Peter E. Stagenga

1990 was the initial year of research at the USDA Brookings Research Farm, three research studies were established in 1990.

1. LISA study - A cooperative study between USDA, Morris, NGIRL, and SDSU.
2. Soil compaction study, Mike Lindstrom
3. Rootworm study, Walt Riedell

An average year of rainfall, but very timely rainfall resulted in very good yields -- Soybeans of 40 bu/acre and corn 125 bu/acre.

A 26 x 36 office and lab building was constructed at the farm, with a 48 x 32 storage addition being added in the fall.

1990 was a very productive year in the establishment of the farm and in getting the research established.

Max Pravecek

1990, the initial year of research at the Eastern South Dakota Soil and Water Research Farm, saw many projects started and much accomplished. Alleys were established and seeded. Plot markers were placed to help identify plot borders. A crew of young people were hired and spent over 115 man hours picking rock. Two volunteers from NGIRL, one from SDSU, and myself spent approximately 100 man hours pulling weeds (cocklebur, ragweed, and sunflower) from the soybean plots.

Grass plots were seeded and became well established but because of the need to control weeds by frequent mowing no yield samples were taken. Also, the legume plots were not sampled because of frequent mowing to control weeds.

Dr. Kieckhefer sampled 2 rows of corn for insects in continuous corn plots 101, 102, and 103 on August 2, plots 219, 220, and 221 on August 8, and plots 316, 317, and 318 on August 16 and found no corn rootworm beetles.

Wheat and soybean yields were very erratic and not what would be expected. Corn yields were consistent but were higher than should be expected in the future possibly because of nutrient carry over.

For specific yields see accompanying grafts.

1990 Input Rates on Research Farm

High input fertilizer rates

90 lb. 46-0-0	wheat
86 lb. 13-33-13	soybean
200 lb. 46-0-0	corn
100 lb. 13-13-13	corn starter
63 lb. 0-45-0	legume

Integrated input fertilizer rates

45 lb. 46-0-0	wheat
47 lb. 13-33-13	soybean
100 lb. 46-0-0	corn
33 lb. 13-33-13	corn starter
31.5 lb. 0-45-0	legume

High input herbicide rates

3 qt. Lasso 1.5 qt. atrazine	corn
3 qt. Lasso 1 qt. Bladex	corn
3 qt. Lasso 1 pt. Sencor	beans
1/2 pt. MPCA (post)	wheat
1 pt. 2,4-D (post)	grass
2 pt. Basagran (post)	beans

2 pt. Basagran 1 pt. atrazine (post)	corn
1/2 pt. MPCA (post)	legume
1.5 pt. Buctril (post)	legume

Integrated input herbicide rates

3 qt. Lasso 1 pt. Senore	beans
3 qt. Lasso 1.5 qt. atrazine	corn
3 qt. Lasso 1 qt. Bladex	corn
1/2 pint MCPA (post)	wheat
1 pt. 2,4-D (post)	grass
2 pt. Basagran (post)	beans
2 pt. Basagran 2 pt. Blazer (post)	legume
1/2 pt. MCPA (post)	legume
1.5 pt. Buctril (post)	legume

High input insecticide rate

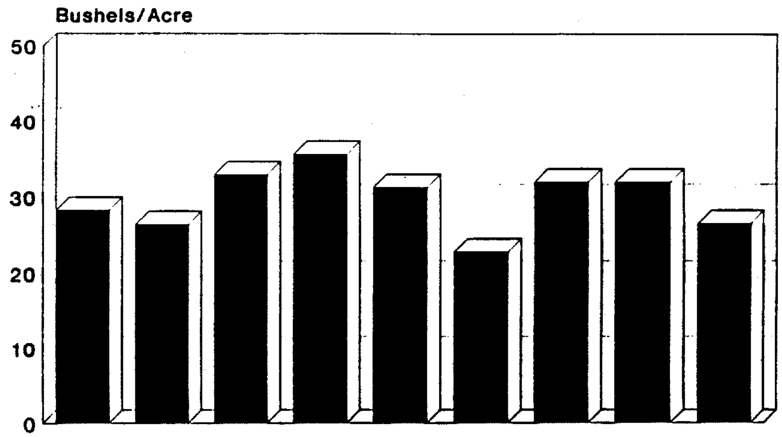
8 oz. Counter

Definitions

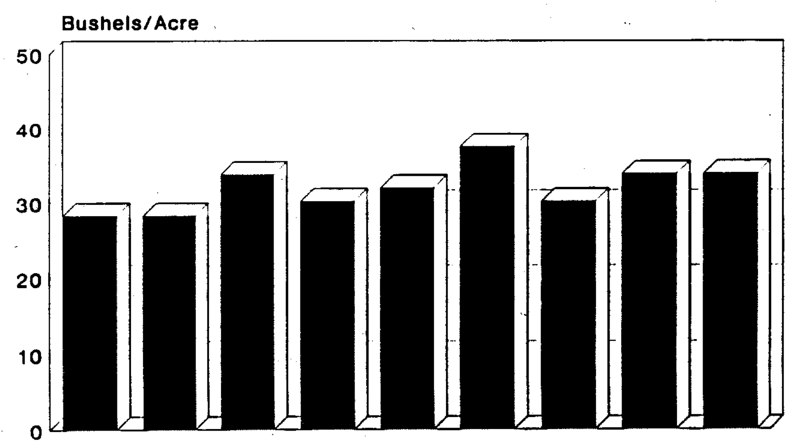
High input: Crops fertilized for maximum county yields. Herbicide broadcast post and pre-emerge. Insecticide applied for corn rootworm. All tillage is high input (moldboard plow and disc).

1990 Soybean Yield

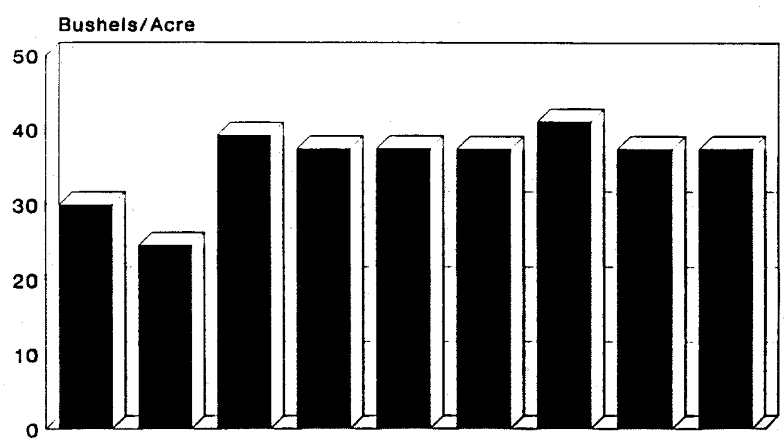
Low Input



Integrated Input



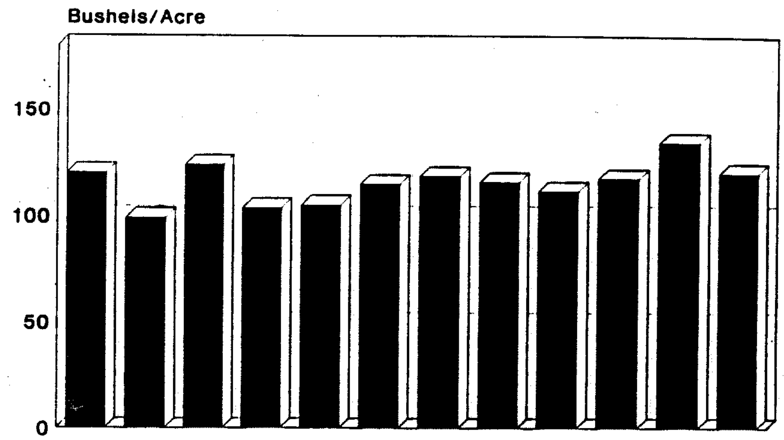
High Input



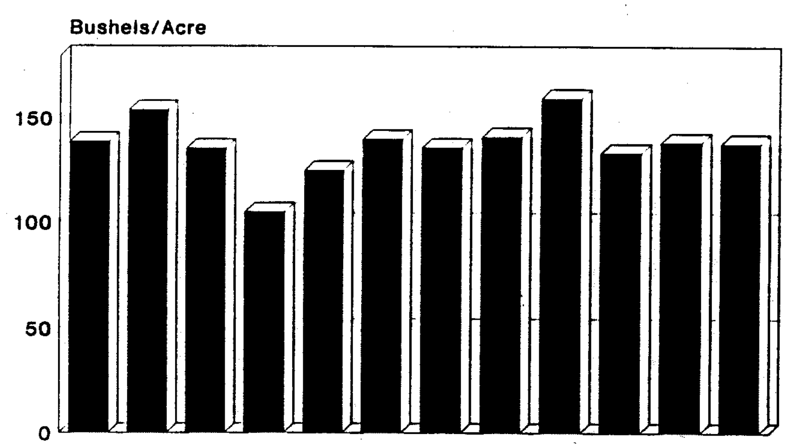
USDA Research Farm

1990 Corn Yield

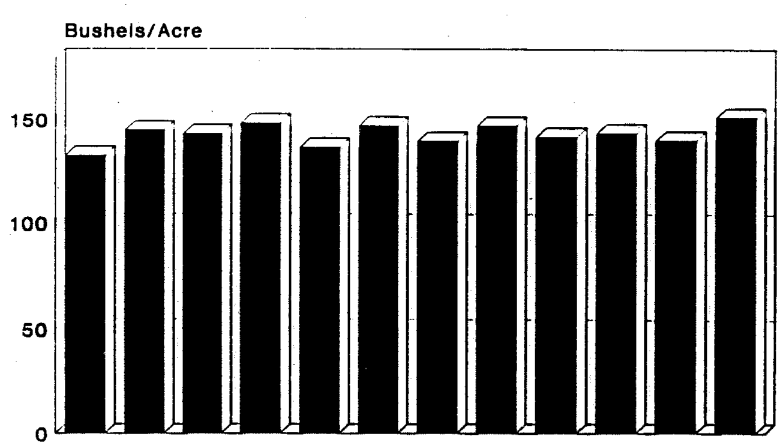
Low Input



Integrated Input



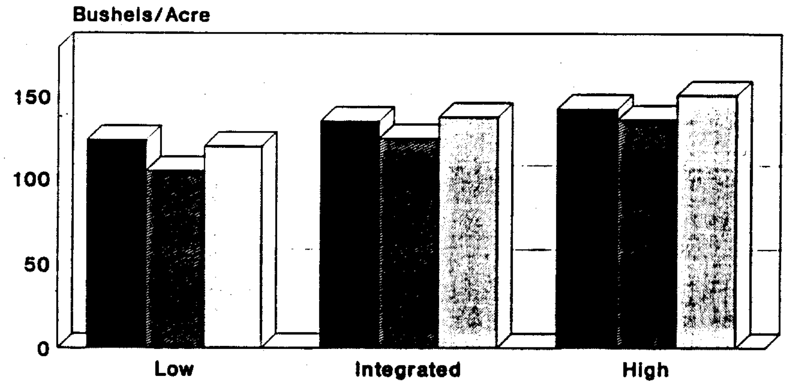
High Input



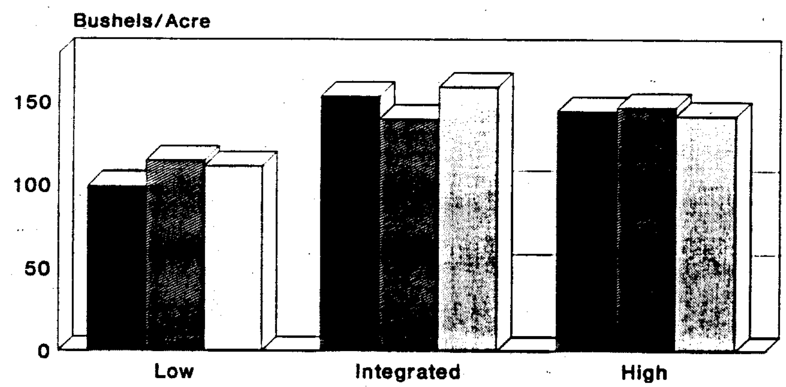
USDA Research Farm

1990 Corn Yield

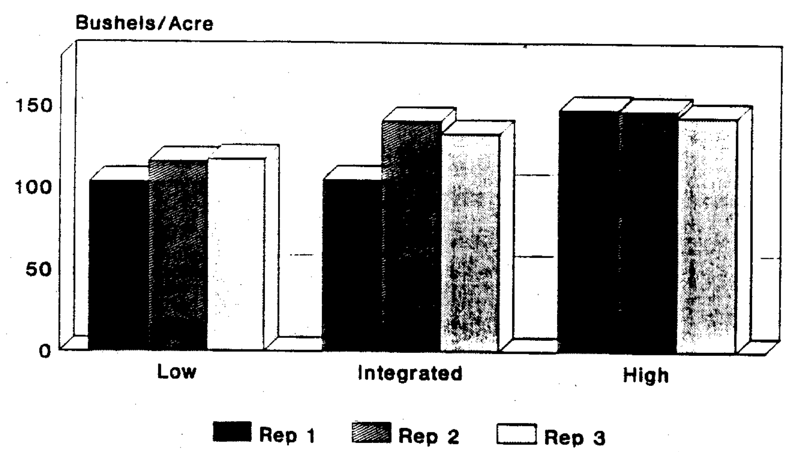
4 Year Rotation



Corn Soybean Rotation on Ridges

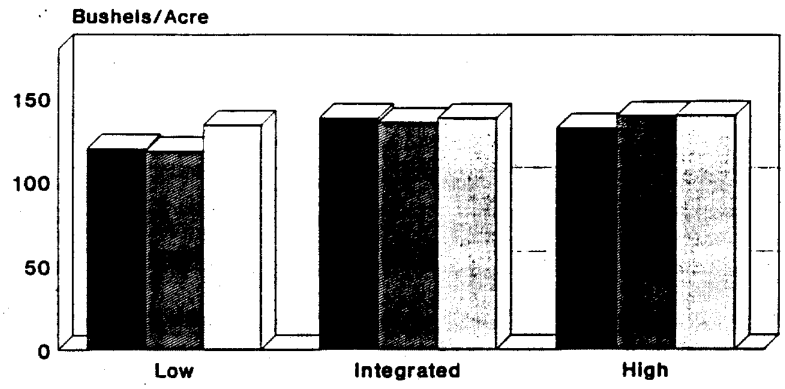


Corn Soybean Rotation

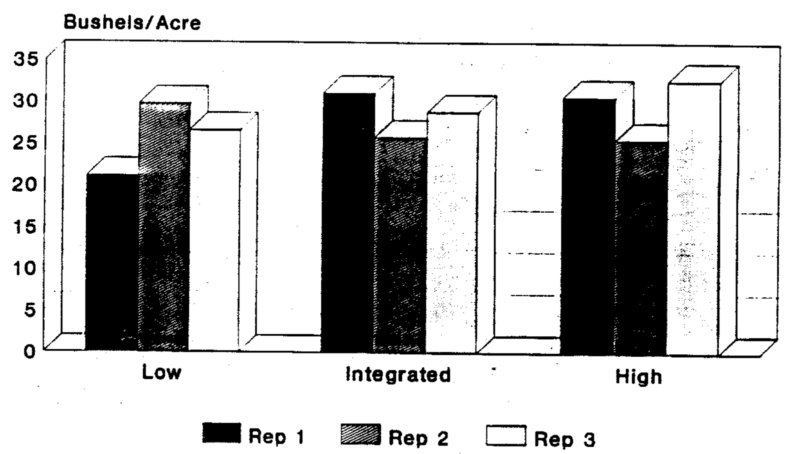


USDA Research Farm

1990 Corn Yield
Continuous Corn

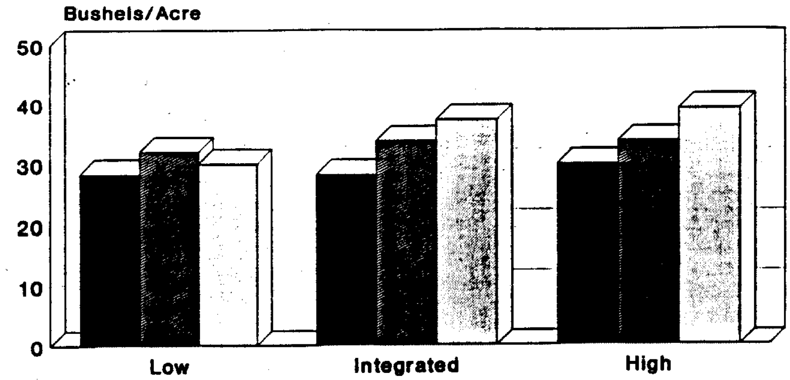


1990 Wheat Yield
4 Year Rotation

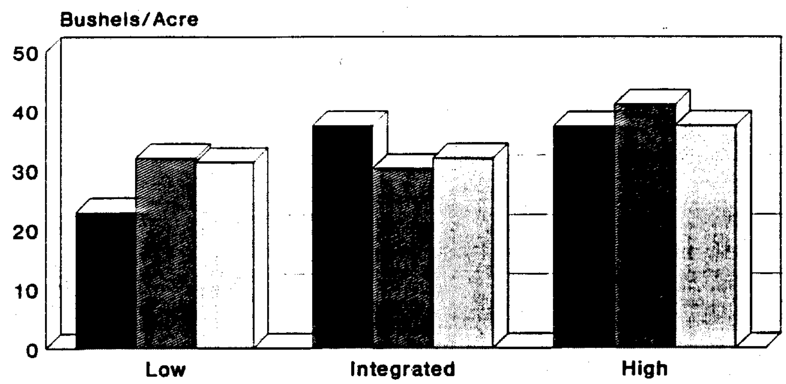


USDA Research Farm

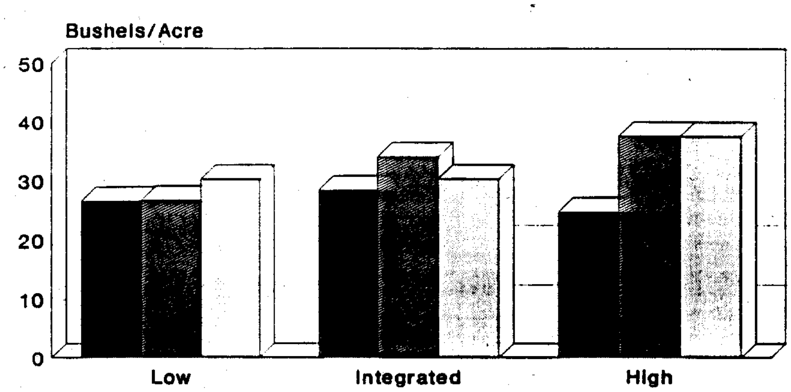
1990 Soybean Yield
4 Year Rotation



Corn Soybean Rotation



Corn Soybean Rotation on Ridges



Rep 1 Rep 2 Rep 3

USDA Research Farm

R. W. Kieckhefer D. A. Beck

Our research objective at the Eastern South Dakota Soil and Water Research Farm is to determine the influence of management treatments (minimum input, integrated, conventional) in several crops (wheat, alfalfa, corn and grasses) on the abundance and diversity of insect populations in the aerial vegetation of these crops. Emphasis is on populations of economic insects of the crops but our studies encompass all of the prevalent species found there. In the wheat plots, for example, a weekly census was made of the populations of cereal aphids and wheat stem maggots, plus such other taxons as leafhoppers, plant bugs, predatory and parasitic insects, grasshoppers, and cutworms. Biomass of insects in each taxon was also determined. Plant growth stage, height, and stand density were recorded. Since the experimental plots on the farm were initiated in 1990, our sampling of insect populations this year was limited to the wheat plots and those corn plots destined to be in continuous corn. In the longer term, we expect to be able to define the major influences of crop management practices on insect populations in the crops.

1990 Weed Research Report

Eastern South Dakota Soil and Water Research Farm

by S. A. Clay, Asst. Prof., Weed Science, SDSU and

E. Perley, Research Technician

This was the first year of weed research at the Eastern South Dakota Soil and Water Research Farm. Large plot areas were split into 3 sections and managed with high, medium, and low input for weed control. All corn and soybean plots were cultivated May 9, June 20, and July 2. Ridges for ridge-till plots were built in early July. All high input plots received a pre-emergence broadcast application of recommended herbicides (for example atrazine (Aatrex) plus alachlor (Lasso), at 1.5 lb ai/A and 3 lb ai/A for corn, Alachlor plus metribuzin (Sencor) for soybeans etc.). All integrated plots were soil sampled in late April and weed seed counts in 20 1-inch cores (to a 6" depth) were obtained. Plots having high weed seed counts were treated with a band application of recommended herbicide. Plots with low weed seed counts were left untreated and evaluated for a post-emergence banded herbicide treatment (these were treated in late June). Low input plots were not treated with herbicides but were cultivated. Also, hand pulling of large broadleaf weeds such as sunflower (Helianthus annuus), cocklebur (Xanthium pennsylvanicum), common ragweed (Ambrosia artemisiifolia), mustard (Brassica sp.), Common lambsquarters (Chenopodium album), and common milkweed (Asclepias syriaca) occurred in early July. This was considered a baseline year and as funding becomes more available more intensive sampling will occur.

Results from seed counts indicate that the most prevalent grass weeds were green and yellow foxtail (Setaria veridis and S. glauca). In some cases, 20 to 30 seeds of these species were extracted from the soil cores (contrasted with 1 or 2 seeds of barnyardgrass (Echinocola crus-galli) found in the same samples) (Table 1). The most prevalent broadleaf weed seed in the cores was common lambsquarters, followed by pigweed (*Amaranthus* sp.), common ragweed, and oxalis (*Oxalis stricta*). Seeds of smartweed (*Polygonum* sp.), prostrate knotweed (*P. aviculare*), wild buckwheat (*P. convolvolus*), and purslane (*Portulaca oleracea*) were also found.

Weeds that were half the height of the crop or taller were hand pulled and counted by species from all plots in July. In most plots, cocklebur and common sunflower were the most prevalent species. The number of these weeds pulled from a plot ranged from 2 in high input corn and soybean plots to upwards of 300 (in one case over 941 plants pulled) in low input plots. The next most troublesome weed was common ragweed in both the intermediate and low input plots with numbers ranging from 0 to over 400/plot.

Common lambsquarters, although the most prominent weed seed, did not pose as much as a problem as cocklebur and common sunflower. Soybean plots were walked one more time in late August to remove further cocklebur, common sunflower, and common ragweed that would have interfered with harvest (counts were not taken at this time). It is interesting to note that common sunflower and cocklebur seeds were not found in any soil samples (perhaps larger size diameter soil core needs to be taken).

Special thanks to Max Pravechek and Pete Stegenga for their valuable assistance in this research.

Table 1. Total weed seed counts in intergrated plots from 20 soil cores per plot.

Weed species	Rep 1	Rep 2	Rep 3
Grasses			
Green Foxtail	53	28	13
Yellow Foxtail	46	50	74
Barnyard grass	0	1	0
Broadleaves			
Common lambsquarters	56	42	29
Pigweed sp.	25	16	3
Common ragweed	15	20	16
Oxalis	16	13	30
Prostrate knotweed	12	14	12
Purslane	7	7	2
Smartweed	4	1	2
Field pennycress	3	0	0
Wild buckwheat	0	1	1

Table 2. Average cocklebur and common sunflower complex and common ragweed plants pulled from corn and soybean plots in early July.

Crop	Input level	Cocklebur/ common sunflower	Common ragweed	Common lambsquarters
Corn	High	56	0	0
	Intermediate	151	62	1
	Low	352	158	4
Corn (Ridge-till)	High	72	9	0
	Intermediate	163	43	0
	Low	152	26	1
Soybean	High	13	1	0
	Intermediate	7*	5*	0
	Low	154	138	1
Soybean (Ridge-till)	High	25	4	0
	Intermediate	69	66	0
	Low	168	154	1

* Most intermediate plots sprayed with Basagran + crop oil shortly before soybeans were walked. This represents the average plants pulled from untreated plots.

C_3 and C_4 Grass Succession in Cultivated Swards
1990 Report

Principal Investigators

K. D. Kephart
Plant Science Department
South Dakota State University
Brookings, SD 57007

T. E. Schumacher
Plant Science Department
South Dakota State University
Brookings, SD 57007

Ecological interactions of C_3 and C_4 species have been investigated extensively for natural native ecosystems. Considerable interest exists in reestablishment of C_3 and C_4 grass swards on previously cultivated land. The objective of this research is to determine relative plant growth and species composition of C_3 and C_4 grass mixtures established on land previously used for annual grain production.

Experimental swards were planted on 8 May 1990. Three sward types included C_3, C_4, and a mixture of C_3 and C_4 perennial grasses. The C_3 species were intermediate wheatgrass (*Elytrigia intermedia* (Host) Nevksi 'Oahe'), orchardgrass (*Dactylis glomerata* L. 'Potomac'), and creeping foxtail (*Alopecurus arundinaceus* Poir. 'Retain'). The C_4 entries were switchgrass (*Panicum virgatum* L. 'Sunburst') and big bluestem (*Andropogon gerardii* Vit. 'Bonnilla').

Desired species composition and seeding rates used for establishment are presented in Table 1. Treatments were arranged in a randomized complete block arrangement with three replicates. Each sward was 0.9 ha. All species were broadcast-planted by hand. Seedbeds were roller-packed before and following seed broadcasting.

Table 1.

Sward type	Species	Recommended[1] seeding rate	Desired composition	Actual[1] seeding rate
C_3	Intermediate wheatgrass	11.2	33	4.6
	Orchardgrass	5.6	33	2.9
	Creeping foxtail	4.5	33	2.5
C_4	Switchgrass	3.4	50	1.9
	Big bluestem	6.7	50	4.6
Mixture	Intermediate wheatgrass	11.2	17	2.4
	Orchardgrass	5.6	17	1.5
	Creeping foxtail	4.5	17	1.2
	Switchgrass	3.4	25	0.9
	Big bluestem	6.7	25	2.2

[1]All seeding rates are on a pure live seed basis.

No data were collected during the establishment year. All C_3 species were well-established by the end of the 1990 growing season. It was difficult to determine the success of C_4 grass establishment because of interference from annual C_4 grass weeds. Based on casual observations, however, big bluestem was adequately established and switchgrass establishment was sparse. Grass growth will be monitored throughout the 1991 growing season.

SPATIAL VARIABILITY OF SOIL PROPERTIES OF THE EASTERN SOUTH DAKOTA SOIL AND WATER RESEARCH FARM, BROOKINGS, S.D.

JOHN MAURSETTER, TOM SCHUMACHER, MIKE LINDSTROM, AND GARY LEMME

This study has the purpose of determining the spatial variability of soil properties and their effects on the variability of nitrates with landscape position, mapping units, and soil type. The study also provides base information on soil properties of the research farm. This information can be referred to in the future for help in explaining research results and determining long term effects of research treatments.

The site of this study is the Agricultural Research Service Eastern South Dakota Soil and Water Research Farm. It is located one and one-half miles north of U.S. Highway 14 at Western Avenue in Brookings and consists of approximately 80 acres of tilled land.

The study site was sampled in August, 1989 on a 30.5 by 30.5 meter (100 by 100 foot) grid to a depth of approximately three meters (10 feet). Horizons were identified on each core. For each core, two samples were taken from each horizon for testing.

TABLE 1-SOIL MEASUREMENTS

MEASUREMENT	METHOD
NITRATES	NITRATE ELECTRODE AND AMMONIA ANALYZER
POTASSIUM	EXCHANGE W/NH OaC & FLAME EMISSION
PHOSPHOROUS	BRAY AND KURTZ #1
ORGANIC CARBON	% LOSS ON IGNITION
pH	1:1 DILUTION W/ pH ELECTRODE
PARTICLE SIZE	PIPETTE METHOD

Also, at this time, description pits were dug at sites in the mapping units that were believed to contain soil types typical for that field. These pits were then morphologically described in detail and samples taken from each horizon for particle size and hydraulic conductivity determinations. Table 1 lists the methods used for soil measurements.

In September 1989, a geologic drilling rig was used to retrieve core samples to the deepest depth possible up to 15 meters (50 feet) below the surface. Also, at this time, if a water table was encountered, the depth to it was recorded.

The data will be statistically analyzed and entered into a geographic information system so that different soil parameters can be overlain and printed as maps for further analysis.

Fig. 1 - Map of grid and soil type for ARS farm

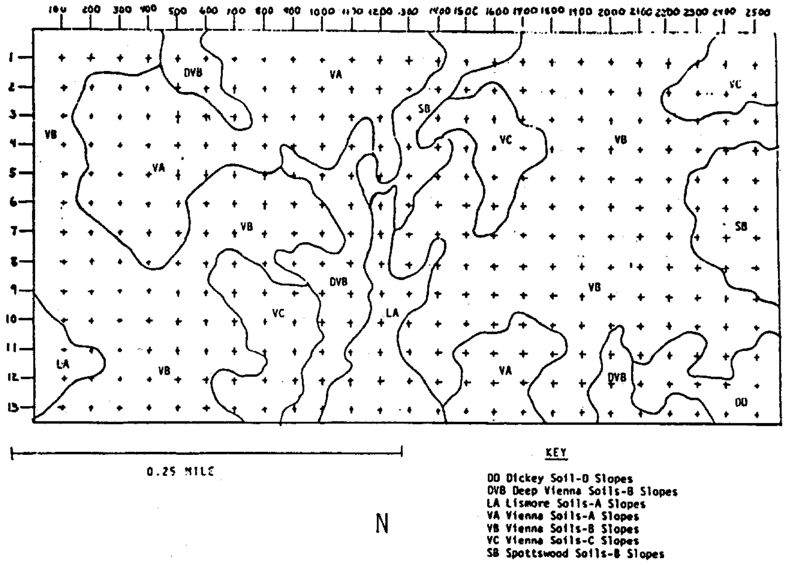


Fig. 2 - Wheat Yield

(Bushels/Acre)

For Brookings ARS Farm, 1989

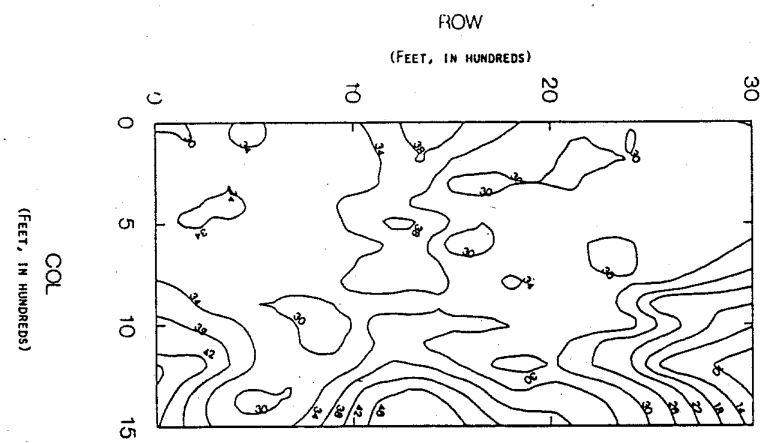
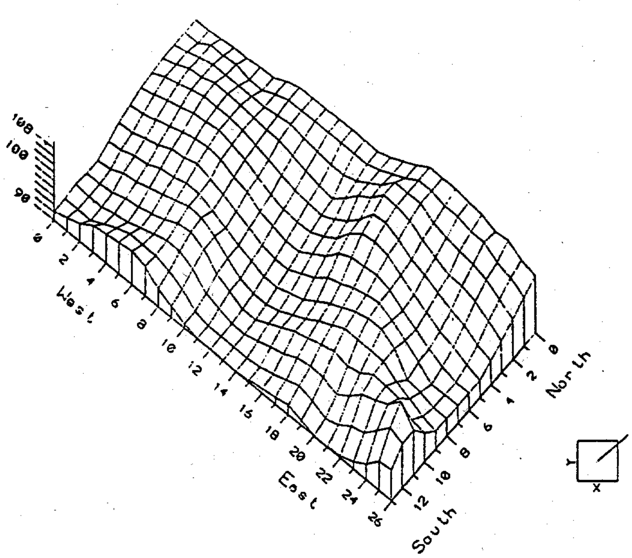
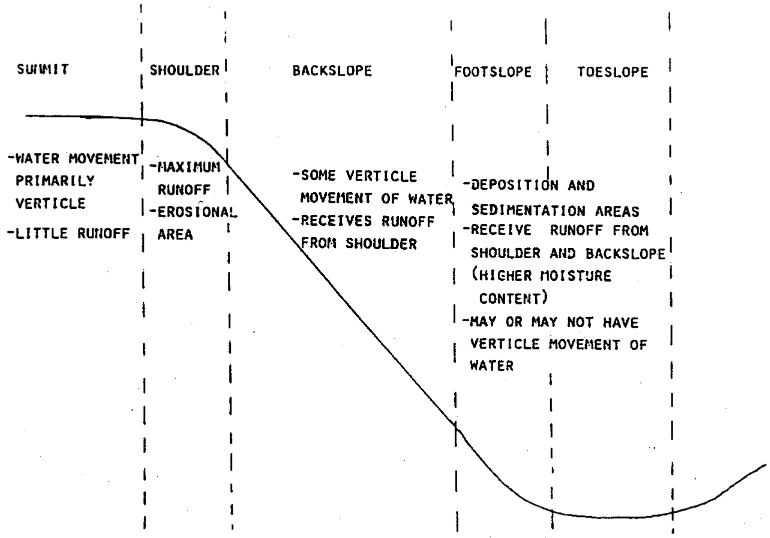


Fig. 3 - TOPOGRAPHY OF ARS FARM BROOKINGS, SD



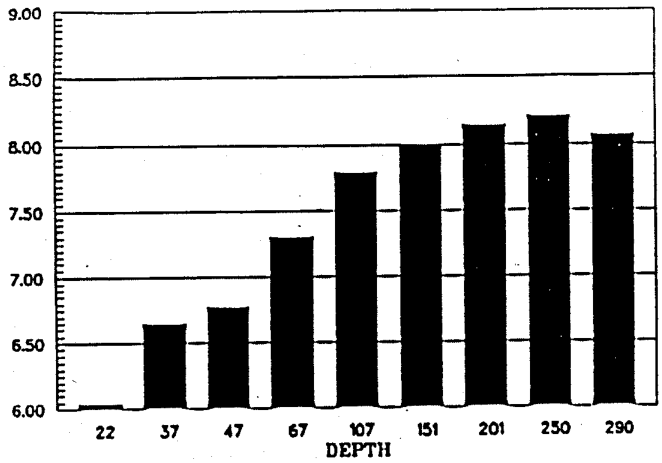
TYPICAL LANDSCAPE POSITIONS



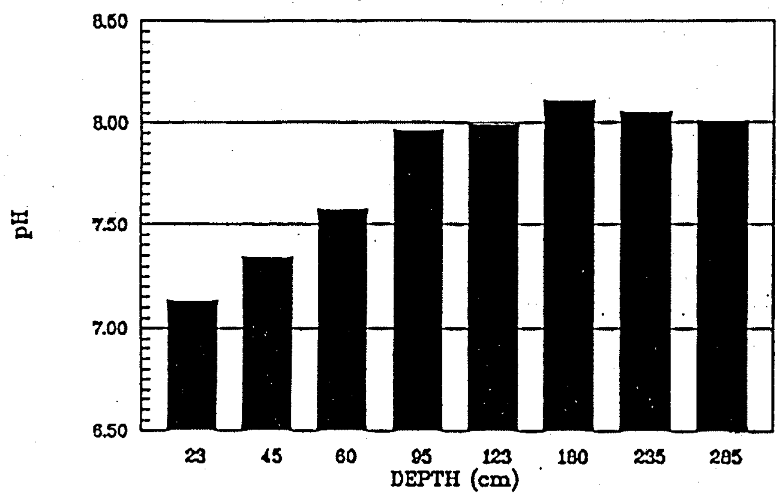
Laboratory measurements are still in progress. The pH data shown is preliminary and may change, but is believed to be representative of the soils at the test site.

It can be seen in the maps of the site (Fig. 1) and wheat yields (Fig. 2) that a correlation between wheat yields and soil type exists. When looking at the topographic map of the farm (Fig. 3), it also can be seen that a relationship exists between landscape positions and wheat yield. As an example, the Dickey soil (8-11% slopes) which consists mostly of shoulder and backslope landscape positions, had the lowest wheat yields. This can be due to a droughty situation in the soil created by its coarse texture, since its coarser texture can not hold as much water as the finer textured soils on the farm. This situation is also aggravated by the relatively large amount of shoulder and backslope positions of the soil. These positions have a larger amount of runoff than other positions (especially the shoulder) and therefore do not have as much water moving into the soil. This runoff could also create a situation of erosion, which could in turn remove some nutrient rich topsoil resulting in lower fertility of the soil. Lower yields were also associated with the Vienna C sloped soils which, like the Dickey soil, has a relatively large amount of shoulder and backslope positions and a history of erosion. The Lismore soil, a lower lying and more level soil, had the highest yields at the site. The soil consists mostly of toe- and footslope landscape positions and serves as a drainageway for water from the study site. It can serve as a 'catch basin' not only for the water running off of the higher landscape positions, but also for the erosional sediment from those positions. This results in higher water content of the soils as well as possibly higher fertility of the soil. The other soils of the farm are of different combinations of landscape positions than these two extremes and

DE?TH vs pH – VIENNA A SLOPE SOILS



DEPTH vs pH – LISMORE A SLOPE SOILS

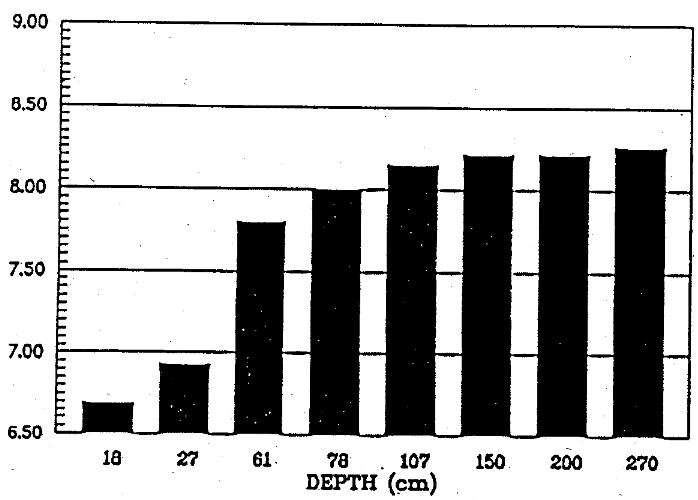


Preliminary pH

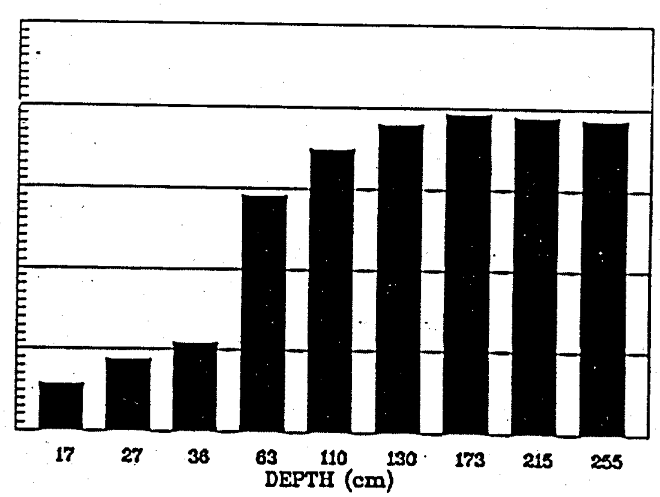
Data For ARS Research

Farm, Brookings, SD

EPTH vs pH –SPOTTSWOOD B SLOPE SOILS



DEPTH vs pH – DICKEY D SLOPE SOILS



result in different yields of wheat.

The relationship between landscape position and pH also appears to be evident. Water is a major factor in the development of soils. Since calcium carbonate is naturally present in glaciated soils and is moved by water in the soil, then a soil with more water movement through its profile should have the carbonates contained in it leached deeper than a soil of the same age but less water movement. Also, because calcium carbonate raises soil pH, the more deeply leached soil would have a deeper depth before the soil pH begins to rise to that of unweathered glacial soil. When graphed, this should result in a more gradual or smaller slope in the line of the graph than a soil that was not as deeply leached.

Based upon the yield data and preliminary pH data, there is a relationship of these two factors, landscape position, and soil series. The soil measurements made at the beginning of the research farm operations will help in future interpretation of research results. The use of a geographic information system (GIS) as a mapping system will enable greater access to the data and aid in integrating results.

Eastern South Dakota Soil and Water Research Farm

1990 Annual Report

Walter Riedell Thomas Schumacher

One of the goals of the research conducted at NGIRL is to improve the economic efficiency and environmental compatibility of corn production. Knowledge of how insect feeding stress affects yield-determining plant processes is needed to efficiently assemble high-yield crop production systems which allow reduced insecticide application rates. Corn rootworms damage specific tissues within the nodal root axes. Under permissive root environments (soil moisture seems to be the most important constraint), root axes respond to rootworm damage with a proliferation of lateral roots. Fertilizer applied to the region of the soil profile where root proliferation is taking place should be absorbed more efficiently in rootworm-damaged plants. If this is the case, banded application of fertilizer could be used by producers to reduce some of the yield loss to rootworms. To test fertilizer placement as a method of reducing yield loss to rootworms, a field study was performed.

Materials and Methods A split-plot experiment with 6 replications with fertilizer treatment as main plots and WCR infestation as sub-plots was performed at the Eastern South Dakota Soil and Water Research Farm located at Brookings SD. Soil tests were used to design fertilizer application for an expected yield of 120 bushels per acre. Fertilizer treatments included broadcast application of 90 lbs per acre liquid UAN (28:0:0) at planting, banded application (10 inch band directly over the row) of the same product at 45 lbs per acre at planting and again at cultivation, and no nitrogen fertilizer. All plots were previously fertilized with potassium and phosphorus fertilizer during spring cultivation. Plots were infested with 0, 500, 1000, or 2000 viable eggs per foot of row using the artificial infestation technique of Sutter and Branson.

Air temperature, soil temperature, soil growing degree day (GDD) accumulation, soil moisture, and precipitation were monitored through the course of the experiment. At regular intervals, plant root systems and surrounding soil were surveyed for corn rootworm development.

All plots were planted with Agripro hybrid AP175 on 23 May 1990. After germination and seedling emergence, plants were thinned to a final stand of 15,000 plants per acre (9 inch plant spacing and 45 inch row spacing). Nitrogen fertilizer was applied to broadcast and banded plots on 24 May 1990. On 26 June 1990, the second application of nitrogen fertilizer was applied to the banded plots.

Root system strength was monitored by measuring the force necessary to pull root systems from the soil using a clamp attached to a milk scale-fulcrum apparatus. Roots were pulled at maximum rootworm damage (majority of larvae in pre-pupae stage of development, 23 July 1990) and again after 16 days (8 August

1990). The roots pulled at maximum rootworm damage were rated using the 1 to 9 scale (1=no damage, 9=3 or more nodes of root axes destroyed). Plant lodging (appearance of goose-neck in plant stem) was assessed on 22 July 1990. Adult insect emergence was monitored using traps (traps applied 28 August and removed 4 September 1990). Ears from fifteen consecutive plants per rep were harvested (26 September 1990), dried to approximately 10 % moisture, shelled and weighed.

Results Statistical analysis appropriate for split-plots has not yet been done. Consequently, only means for various treatments will be presented here.

Figure 1 shows a visual representation of root pull resistance and root damage characteristics of root systems from infested and uninfested plants.

Root pull resistance at maximum root damage (Fig. 2) was similar across all fertilizer treatments at the 0 eggs per foot level. Under insect infestation, root pull resistance in the broadcast treatment was lower than that seen in the banded treatment. The root pull resistance for infested control plants appears to be greater than the other infested plants given fertilizer.

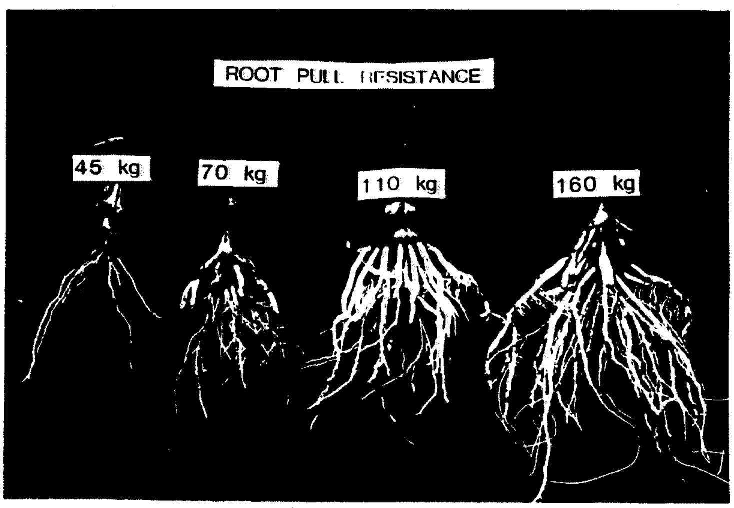
Lodging of plants at maximum root damage (Fig. 3) was absent in the 0 eggs per foot across all fertilizer treatments. Lodging caused by insect damage was greatest under the broadcast treatment. Similar levels of lodging were seen under banded and unfertilized treatments at the 1000 and 2000 eggs per foot levels. Lodging at the 500 eggs per foot level was considerably less in the unfertilized treatments than that seen at this infestation level in the banded and broadcast treatments.

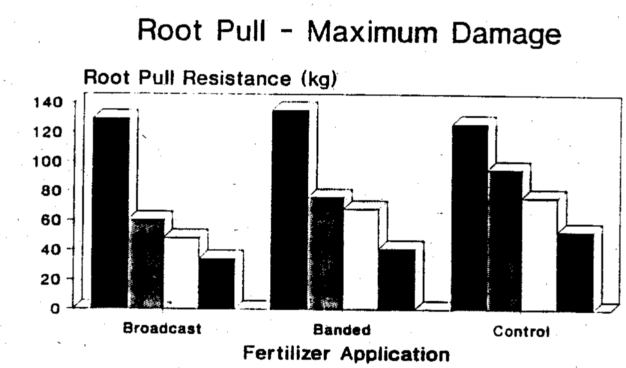
Root pull resistance after root recovery (Fig. 4) was greater in the unfertilized treatment than in broadcast treatment. Under insect infestation, root pull resistance in the banded and unfertilized treatments were similar, and were greater than the resistance seen for broadcast treatments.

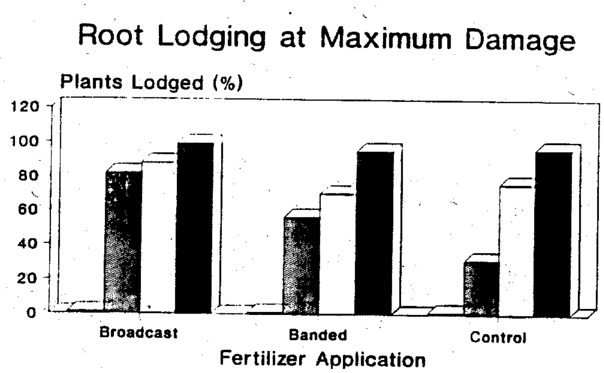
Insect survival to adulthood (Fig. 5) was much lower across all infestation levels in the unfertilized plots when compared with plots given fertilizer. Grain yield (Fig. 6) in uninfested plants was similar across all fertilizer treatments. In general, grain yield was reduced by infestation to an equal degree by rootworm infestation.

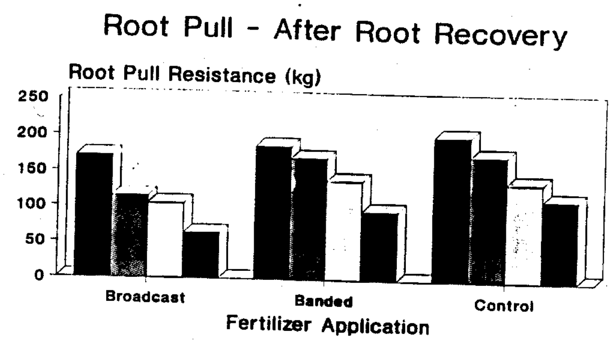
Discussion The biggest differences in insect damage, insect survival and plant characteristics were present between the unfertilized (control) plots and those plots which received fertilizer. It is possible that the plants in the unfertilized treatment had slower growth and smaller root systems in the early part of the growing season than plants given fertilizer. Such a reduction in the growth habit of the root system could influence rootworm populations by restricting larvae establishment during hatch and by causing increased competition between established larvae for food. This hypothesis is further supported by the observations that root ratings, lodging, and adult survivability were lower and root pull resistance was higher in plants given no fertilizer than in plants given fertilizer. Unfortunately, data on plant development or root system growth was not taken during this study. Such data would be important in providing additional evidence to support or refute the hypothesis.

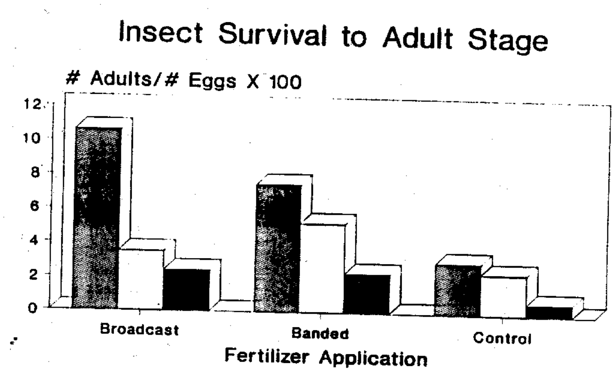
The weather was rather uncooperative during this field study. Considerable precipitation (>1.5 inches) fell the day after the liquid UAN was applied to the broadcast and banded plots. In addition, a second rainfall event (>3 inches) took place during the growing season. Erosion and standing water within the plots was common at these times. Consequently, it is important to stress here that the results presented above are only preliminary, and additional data is needed to substantiate the validity of the conclusions.

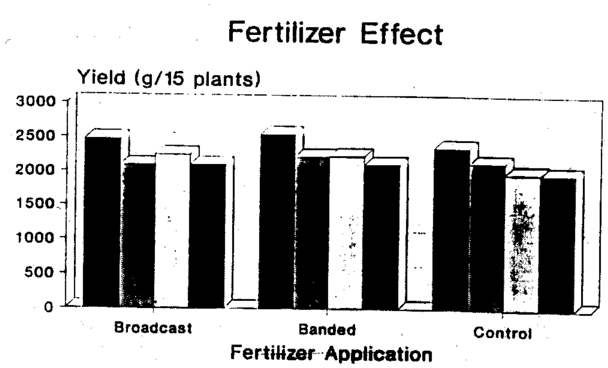












Infestation Level

Control 500 eggs/ft 1000 eggs/ft 2000 eggs/ft